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TECHNICAL RESEARCH NOTE 96

**Abstracts of
PRB Research Publications
FY 1958**

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PERSONNEL RESEARCH BRANCH

Research and Development Division
The Adjutant General's Office
Department of the Army

PRB Technical Research Note 96

ABSTRACTS OF PRB RESEARCH PUBLICATIONS--FY 1958

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September 1958

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INTRODUCTION

This volume identifies both by publication serial number and by R and D Research Task all research publications prepared and released by the Personnel Research Branch of The Adjutant General's Office in FY 1958. The listing includes 4 Technical Research Reports, 19 Technical Research Notes, 25 Research Memorandums, and 2 Research Studies.

Abstracts have been prepared for the majority of FY 1958 publications. Where a publication has been abstracted, the principal research findings have been described in non-technical language as much as possible. Technical language has generally been used as the most expeditious method of communicating details of research design and analysis.

FY 1958 RESEARCH PUBLICATIONS

Types of Publications

PRB Technical Research Reports are publications describing completed research studies or programs which contribute directly to the solution of Army personnel problems. The Report is generally divided into two parts--a brief general report to management and a technical supplement.

PRB Technical Research Notes are primarily of interest to technically trained research workers in the national Military Establishment and in other governmental research agencies. Notes present technical information concerning research methodology or basic psychological knowledge growing out of the work program.

PRB Research Memorandums are technical publications presenting information, the scope of which is of interest primarily within the Personnel Research Branch. Research Memorandums include the following types of content: details concerning construction of experimental instruments, fragmentary or incidental data, and methodological developments relating primarily to PRB operations. Because significant Research Memorandum content is eventually incorporated within Technical Research Reports and Notes, and through these media becomes available for general use, outside distribution is usually not made.

PRB Research Studies constitute a new research publication series. Research Studies are special reports to military management, generally prepared in response to questions raised by operating agencies when early answers are needed. Research Studies may include presentations to military management, interim bases for changes in personnel operations, and bases for research decisions. Distribution is restricted to operating agencies with a direct interest in contents. As with the Research Memorandum, however, significant Research Study content is eventually incorporated within Technical Research Reports and Notes and through these media becomes available for general use.

Numbering Systems

PRB research publications are numbered consecutively and continuously from year to year, in separate series for the four types of publications. Publications released during FY 1958 include Reports 1107 to 1110, and Notes 76 to 94. Research Memorandums prepared during FY 1958 include RM 57-16 to RM 57-30 and RM 58-1 to RM 58-10. Research Studies prepared during FY 1958 include RS-1 and RS-2.

Distribution

Initial distribution of each Report and Note is made directly by the Personnel Research Branch. The Report is distributed primarily to operational and research facilities and their sponsors in the Department of Defense, to other interested governmental agencies, and to the Library

of Congress which in turn distributes to depository libraries. The Note is distributed primarily to technically trained research workers, including those reached through Library of Congress channels.

Qualified agencies and individuals not on initial automatic distribution may be furnished copies of Reports and Notes upon request to the Personnel Research Branch as long as initial stocks last. When stock has been exhausted, copies may be obtained through the following sources:

Department of Defense agencies and their contractors should address requests for copies to: Commander, Armed Services Technical Information Agency, ATTN: TIPDR, Arlington Hall Station, Arlington 12, Virginia.

Other agencies and individuals may obtain information concerning availability and cost of microfilm or photostatic copies from: American Documentation Institute, Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D. C.

Copies may also be obtained on loan from depository libraries in many metropolitan and university centers. A list of these libraries appears on Pages 21 through 23.

Research Memorandums and Research Studies are not available for general distribution.

FY 1958 TECHNICAL RESEARCH REPORTS

1. No. 1107. Parrish, J. A. and Drucker, A. J. *Personnel research for Officer Candidate School.* November 1957.

The Personnel Research Branch of The Adjutant General's Office has included in its mission a continuing research effort to provide for the Army means of identifying enlisted personnel who through training in OCS could become effective reserve officers. The purpose of this study was to report accounts of research conducted by the Army's research scientists in the accomplishment of that mission.

The most consistently successful device for predicting peer and tactical officer ratings of leadership in OCS has been a test battery, yielding a validity coefficient of around .45, consisting of a self-description inventory, evaluations by superiors of leadership potential in basic training, and a structured panel interview. A special inventory key has predicted a pass-resign criterion $r = .50$. Peer and tactical officer ratings have been good predictors of officer performance in garrison and combat, while academic grades have shown little relationship.

As a result of studies such as those reported above, the Army has been provided with an administratively feasible selection system consisting of a mental ability screen and a leadership selection battery. Included in the battery is an instrument demonstrating promise for early identification of potential resignees.

Factors influencing the effectiveness of the operational OCS selection battery have been discussed at length. Operational effectiveness has been shown to be in part dependent upon continued similarity of OCS training to officer requirements, constancy of OCS evaluations, and availability of a sufficient number of OCS applicants to justify a selection procedure. The problems of attrition in OCS are seen as highly complex, since much of OCS applicant and candidate motivation is circumstantial and hence unpredictable. The use of the new resignation predictor is seen as a partial solution to the problem of high attrition; introduction of a standardized evaluation system at OCS as another.

2. No. 1108. Kaplan, H., Rosenberg, N., Robinson, J. E., and Berkhouse, R. G. *Further on-the-job evaluation of the English Fluency Battery for Insular Puerto Ricans.* November 1957.

The 1954 changes in the Insular Puerto Rican training program (from 20 weeks of basic military training interspersed daily with English training to a program of eight weeks of English training followed by 16 weeks of basic combat and advanced military training) led to the requirement that the English Fluency Battery used to measure the English proficiency of IPR's prior to training and assignment be reevaluated. In addition, an assessment of the value of the newer training program in terms of amount of English proficiency attained was required.

To revalidate the English Fluency Battery, a representative group of 541 IPR's was tested prior to English training, after English training, and again after sixteen weeks of basic combat and advanced individual training. Scores were correlated with formal ratings of English proficiency on the job four months after assignment. In addition, gains in English proficiency from the beginning to the end of formal English training, from the end of formal English training to the end of eight months of exposure to English usage, and between the new and old training programs were determined.

The EFB was found to be very satisfactory for predicting which IPR's would show later English proficiency, coefficients of .48 and .54 being obtained against English proficiency ratings on the job for the two forms of the Battery. The eight weeks of formal English training in Puerto Rico were followed by a noticeable gain in English language proficiency, but further gains after training and assignment in CONUS involving no formal English training were not obtained. Trainees of the new program were slightly more proficient than those of the old program.

EFB (Form 2) was recommended for use as the test to determine English fluency readiness for basic combat and advanced individual training, with a cutting score of 80. Form 1, with a cutting score of 88, was recommended for use in retesting those IPR's required to take two additional weeks of English language training. The difference between this cutting score and that for the other form of EFB takes into account previously noted differences in difficulty level.

3. No. 1109. Trump, J. B., White, R. K., Johnson, C. D. and Fuchs, E. F. *Standardization of common core tests*. December 1957.

Five new classification tests, constructed jointly by Army, Navy, and Air Force research scientists, required standardization analysis. The tests, reflecting the common thread of personnel requirements across the services, had been previously constructed to effect improvement and economies in classification test construction for all the services. For the Army, there was the additional need to determine the suitability of the new tests for incorporation within the Army Classification Battery.

To furnish necessary research data, Army, Navy, and Air Force experimentally tested a total of 3000 newly inducted men with the five common core tests. Navy and Air Force submitted their scores to Army which constructed tables applicable to full mobilization conditions with which to convert raw test scores to the standard score system of each service. Appropriate conversion tables were constructed and furnished each service.

Army found that Common Core Verbal and Arithmetic Reasoning Tests could improve upon the Reading and Vocabulary and Arithmetic Reasoning Tests of the ACB from the general aspects of administrative feasibility and because of an improved pattern of intercorrelations. The Common Core Verbal and Arithmetic Reasoning Tests were included as ACB replacements for the Reading and Vocabulary and Arithmetic Reasoning Tests in June 1957. Army planned to revise and restudy the remaining three tests--a mechanical knowledge test and two spatial tests.

4. No. 1110. Willemin, L. P. and Karcher, E. K., Jr. *Development of combat aptitude areas.* January 1958.

Existing Army Classification Battery tests and aptitude area composites have since 1949 been shown to be consistently valid for assigning enlisted men into a multitude of technical, common specialty, and support jobs but less valid for assigning to combat. In studies conducted in the Arctic in 1949 and 1950, in Korea in 1951 and 1953, and in a training-maneuvers situation in 1955 and 1956, promising new tests measuring vital personality and interest aspects of successful combat potential were developed to predict combat, maneuver-garrison, and Advanced Individual Training criteria. Over 10,000 men were involved in these studies. These tests were then refined and given the necessary experimental tryout in establishing their utility as Army classification procedures.

As a result of this research, two new tests are being introduced into the Army Classification Battery. They will form part of two new aptitude areas for classifying to the Combat Arms. Aptitude Area IN, consisting of the Classification Inventory and the Arithmetic Reasoning Test, is to be installed as the best available test composite for classifying to Infantry. Aptitude Area AE, consisting of the General Information Test and the Automotive Information Test, has been found best for Artillery, Armor, and Combat Engineer assignment, and will be so used.

FY 1958 TECHNICAL RESEARCH NOTES

5. No. 76. Willemin, L. P., Rosenberg, N., and White, R. K. *Validation of potential combat predictors: ZI results for Infantry.* July 1957.

Since the introduction in 1949 of the aptitude area system of classification, research has continued toward the objective of improving effectiveness in personnel classification and assignment for Combat Arms. As a result of research leads found in studies of arduous Arctic assignment and of actual combat in Korea, a new series of studies was initiated in December 1953 to identify the most promising of a large number of new experimental combat predictors, to validate these predictors in a follow-up (longitudinal) study involving 4000 members of an Army Gyroscope unit, and to select from the most promising those to be incorporated into revised Combat Arms Aptitude Areas.

The present study was the fifth in a series leading to the identification of valid combat predictors for operational use. Its purpose was to present preliminary validity and test selection results for combat jobs in Infantry Branch, based on the interim criterion obtained after 16 weeks of training. Army Classification Battery tests, 15 experimental predictor tests, Form 20 information, and 5th-training week peer ratings of estimated combat potential were validated against the 16th-week training performance criterion of similar ratings for 1506 Infantry Branch personnel.

The most valid composites included ACB tests and experimental predictors, particularly personality measures. A validity coefficient of .45 for the fifth-week peer ratings was substantially higher than that for any other single measure tried out in the study. It is not known, however, to what extent this coefficient was influenced by rating bias factors. Considerably greater cross-validity was obtained with composites both excluding ($r = .58$ and $.63$) and including ($r = .45$) predictor ratings than with the existing Combat Arms Aptitude Areas ($r = .29$).

6. No. 77. Willemin, L. P. and Rosenberg, N. *Validation of potential combat predictors: ZI results for Artillery.* July 1957.

This study is the sixth in the current combat arms selection research series, general objectives of which are stated in the previous Research Note, No. 76. The purpose of this study was to furnish validity results for the Artillery Branch also based against the 16th-week interim training criterion for consideration in selecting new Combat Arms Aptitude Areas.

Testing was conducted in the 10th Infantry Division before the beginning of the training cycle for 166 enlisted men later assigned to Artillery Branch. Both 5th-week predictor (peer) ratings and the 16th-week rating criterion were based upon the Combat Aptitude Rating. Results obtained were consistent with the findings in the earlier study: 1) the most valid composites included both ACB tests and experimental predictors; 2) the most accurate predictors were obtained with 5th-week ratings of estimated combat potential; 3) composites including and excluding predictor ratings were both higher in validity than the present Combat Arms Aptitude Areas. For the Artillery Branch, validity coefficients of .57 and .40 were obtained in the respective composites as compared to aptitude area values of .32 for CO-A and .37 for CO-B.

7. No. 78. Bimbaum, A. H., White, R. K., Rosenberg, N., and Willemin, L. P. *Validation of potential combat predictors: ZI results for Armor.* July 1957.

The present study, seventh in the current combat arms selection series, reviews Zone of Interior research for Armor conducted within the general framework described in an earlier report, Research Note 76. Preliminary validity and test selection results are given for combat jobs in Armor Branch based on the interim criterion obtained after 16 weeks of training. Basic validity analysis was made on test scores and ratings of 330 enlisted men in the 10th Infantry Division, later assigned to Armor.

As in the two previous studies, findings indicated 1) the most valid test composites included both ACB measures and experimental predictors; 2) the most valid single measure was the 5th-week predictor rating ($r = .64$). For Armor however, about equal validity ($r = .41$) was obtained with the most valid composite excluding predictor ratings and with the existing Combat Arms Aptitude Areas.

8. No. 79. Birnbaum, A. H., Rosenberg, N., White, R. K., and Willemin, L. P. *Validation of potential combat predictors: ZI results for Combat Engineer.* July 1957.

This study was the eighth in the series of research studies leading to the identification of valid combat predictors, on the basis of ZI information, for operational use. ZI research results have been reported separately for Infantry, Artillery, and Armor in preceding Research Notes 76, 77, and 78. The present Research Note reports validity and test selection results for combat jobs in Combat Engineer Branch. Pre-training cycle test scores and 5th-week peer ratings for 71 Combat Engineer trainees were validated against a 16th-week interim criterion of similar ratings.

For the Combat Engineer sample, it was found that the ACB tests as a group were not as valid as had been expected. Only the Army Clerical Speed Test ($r = .34$) compared as favorably with some of the experimental tests. The most valid single measurement appeared to be the 5th-week predictor rating ($r = .70$). Validity coefficients obtained for the most valid test composites--with and without the predictor rating (.66 and .51, respectively)--were considerably higher than that of the two aptitude areas currently used for selection to Combat Arms (CO-A = .14; CO-B = .21).

9. No. 80. Willemin, L. P., Birnbaum, A. H., Rosenberg, N., and White, R. K. *Validation of potential combat predictors in overseas maneuvers.* August 1957.

This Research Note describes the ninth in the current series of research studies concerned with identification of valid combat predictors for operational use. The purpose of this study was to present final validity and test selection results for four combat arms samples (Infantry, Artillery, Armor, and Combat Engineer) based on the overseas maneuver criterion obtained one year after predictor testing. Testing was conducted in the 10th Infantry Division before the beginning of Basic Combat Training during April and May 1955. Analysis was based on test scores of 1642 combat arms personnel in relation to the overseas maneuver criterion ratings obtained in April 1956.

The patterns of validity results remained similar from the ZI to the overseas situation within all branches except Combat Engineer. In general, the overseas validity coefficients, although appreciably below the ZI coefficients in all branches except Combat Engineer, were of an acceptable magnitude for predictive purposes. Test composites utilizing the personality questionnaire, two experimental predictors and two ACB tests were more valid than the present Combat Aptitude Areas, not only for the branch in which they were chosen, but in general for the other branches also.

10. No. 81. Drucker, A. J. *Listings and abstracts of PRB Technical Research Reports and Notes--FY 1957.* September 1957.

11. No. 82. Helme, W. H. and White, R. K. *Prediction of success in engineer equipment maintenance and automotive maintenance courses.* September 1957.

The goal of the Army's classification program is to place individuals in various assignments in such a way that the average effectiveness of all individuals in all assignments, including both combat and combat support assignments, will be a maximum. The tests of the Army Classification Battery (ACB) are the main instruments of the classification program. Enlisted men are assigned to training for Army jobs on the basis of aptitude area scores derived from these tests. A program of continuing research provides information as to which aptitude area and which score on that aptitude area is needed to insure that failures in training and on the job are held to a minimum.

In the present study, composites of the Army Classification Battery, the current aptitude area and a logical alternate, were validated against final grades for 2452 trainees completing Army school courses between May 1954 and March 1956 in Engineer Equipment Maintenance (N = 811), Wheel Vehicle Repair (N = 560), Artillery Track Vehicle Maintenance (N = 585), and Army Track Vehicle Maintenance (N = 496). In addition, the effectiveness of various cutting scores for the current aptitude area was determined.

The current selector, Aptitude Area Motor Maintenance (consisting of the Automotive Information Test, with a weight of 2, and the Mechanical Aptitude Test, with a weight of 1) had highly satisfactory validity for these courses ($r = .60$ to $.72$), superior to that of the alternate. A reduction in the cutting score to a standard score of 80 was indicated for the Wheel Vehicle Repair and both Track Vehicle Maintenance courses on the current selector.

12. No. 83. Helme, W. H., Trump, J. B., and White, R. K. *Prediction of success in carrier repair, teletype maintenance, and power equipment maintenance courses.* October 1957.

The present study was another in the program of continuing research to provide information as to which aptitude area and which score on that aptitude area is needed to insure that failures in training and on the job are held to a minimum. Aptitude Area Electronic, the current selector, and Aptitude Area General Maintenance, the logical alternate selector, based upon tests of the Army Classification Battery, were validated against final grade for 2766 trainees completing Army school courses between February 1952 and March 1955 in Repeater and Carrier Equipment Installation and Maintenance (N = 898), Teletypewriter Equipment Maintenance (N = 903), and Power Equipment Maintenance (N = 965). In addition, the effectiveness of various cutting scores for the current aptitude area was determined.

Aptitude Area EL, the current selector (consisting of the Electrical Information Test, the Radio Information Test, and the Mechanical Aptitude Test, weighted equally) had highly satisfactory validity for the Carrier Repair Course ($r = .81$) and was adequate for the Teletype Maintenance

Course, but the alternate Aptitude Area GM (consisting of Pattern Analysis Test, with a weight of 1, and Shop Mechanics Test, with a weight of 2) was more satisfactory for the Powerman course ($r = .86$, as compared to $.74$). A decrease in the EL cutting score for the Teletype Maintenance course was indicated in the interest of obtaining better manpower allocation.

13. No. 84. Helme, W. H., Gibson, W. A., and Brogden, H. E. *An empirical test of shrinkage problems in personnel classification research.* October 1957.

Determination of the validity of the Army Classification Battery (ACB) is the subject of continuing research. Potential composites of ACB test scores are validated against success in school training or on the job. Where single jobs or single job families are involved, justification had previously been found for the use of single research samples in validation studies rather than the use of two samples, which permits findings on one sample to be generalized or cross-validated to the other. Where many job families are involved, as when the aptitude area system is to be reconstituted, the use of single samples is acknowledged to result in over-estimates of validity.

The purpose of the present study was to determine the extent of such over-estimates, for if they are found to be negligible, then use of the simpler research design calling for pooling the data for each job into a single sample could be justified for future reconstitution of the aptitude areas. Data previously obtained for studies on prediction of success in 35 Army School courses were used in the study. The design employed was a conservative one, favoring the two sample design for the validation studies. In this way, evidence in support of the single sample design would have to be such as to leave little doubt concerning the justification of the single sample design.

The results of the study revealed that over-estimates of validity were slight. Hence the single sample design could be justified for use in future reconstitution of the aptitude areas.

14. No. 85. Helme, W. H., Sharp, L. H., and White, R. K. *Prediction of success in photography courses.* December 1957.

The present study was another in the program of continuing research to provide information as to which aptitude area and which score on that aptitude area is needed to insure that failures in training and on the job are held to a minimum. Aptitude Area General Technical, the current selector, and Aptitude Area General Maintenance, the logical alternate selector, based upon tests of the Army Classification Battery, were validated against final grade for 1607 trainees completing Army school courses between January 1954 and October 1955 in Motion Picture Photography--Enlisted ($N = 384$) and in Still Photography and Photographic Laboratory Procedures ($N = 1223$). In addition, the effectiveness of various cutting scores for the current aptitude area was determined.

Aptitude Area GT, the current selector (consisting of the Reading and Vocabulary and Arithmetic Reasoning Tests, equally weighted) appeared to have satisfactory validity when compared to the predesignated logical alternate (Aptitude Area GM, consisting of Pattern Analysis, with a weight of 1, and Shop Mechanics, with a weight of 2). Coefficients were .59 compared to .52 in the Motion Picture course and .54 compared to .49 in the Still Photography course. A reduction in the cutting score from a standard score of 90 to 80 was indicated for both courses.

15. No. 86. Helme, W. H., Trump, J. B., and White, R. K. *Prediction of success in auxiliary services and supply handling courses.* December 1957.

The present study was another in the program of continuing research to provide information as to which aptitude area and which score on that aptitude area is needed to insure that failures in training and on the job are held to a minimum. Aptitude Area General Maintenance, the current selector, and Aptitude Area General Technical, the logical alternate selector, both based upon tests of the Army Classification Battery, were validated against final grade for 1307 trainees completing Army school courses between July 1954 and September 1955 in Laundry and Dry-Cleaning Machine Operation ($N = 375$), Fumigation and Bath Processing ($N = 239$), and Supply Handling ($N = 693$). In addition, the effectiveness of various cutting scores for the current aptitude area was determined.

Aptitude Area GM, the current selector (consisting of the Shop Mechanics Test, with a weight of 2, and the Pattern Analysis Test, with a weight of 1) appeared to be slightly more valid than the predesignated logical alternate (Aptitude Area GT, consisting of the Reading and Vocabulary Test and Arithmetic Reasoning Test, equally weighted) in the laundry course ($r = .56$, compared with .53), somewhat less valid in the fumigation course ($r = .51$, compared with .61), and slightly more valid in the supply course ($r = .32$, compared with .28). The estimates of validity for the supply course were considerably lower than customarily obtained in predicting course success. No changes either in the composites or in their cutting scores were recommended on the basis of these findings.

16. No. 87. Birnbaum, A. H., White, R. K., Rosenberg, N., and Willemin, L. P. *Selection and standardization of tests for improved combat aptitude areas.* December 1957.

The present study was one of an earlier series of Technical Research Notes describing research leading to the identification of valid combat predictors for operational use. Notes 70, 72 and 73 described test development, preliminary tryout, final selection of experimental predictors for the Riley longitudinal study, and research design to be employed. Notes 76 through 80 presented validity and test selection results for combat jobs in four combat arms branches against a 16th-week training performance criterion (CONUS) and after overseas maneuvers.

The principal purpose of this study was to select potential new combat aptitude area composites based upon Korean combat, overseas maneuvers, CONUS research information and percent of total manpower pool identified by these new composites for the various combat arms branches.

The most promising experimental tests were standardized on 1500 new Army enlisted men undergoing classification at 3 reception stations in April 1957. The best combination of composites to replace Aptitude Areas CO-A and CO-B were the Classification Inventory (double-weighted because of its consistently high validity in combat research) plus the Arithmetic Reasoning Test for Infantry, and the General Information Test plus the Automotive Information Test for Artillery, Armor, and Combat Engineer branches. The proposed aptitude area change resulted in a better match between manpower requirements and availabilities than was obtainable with the currently constituted aptitude areas. In general, the composites thus selected were best from a point of view of validity, intercorrelations, and meeting current Army manpower needs.

17. No. 88. Helme, W. H. and White, R. K. *Prediction of on-job performance in AAA gun crew specialties.* January 1958.

The present study was another in the program of continuing research to provide information as to which aptitude area and which score on that aptitude area is needed to insure that failures on Army jobs are held to a minimum. Aptitude Area Combat-A and Combat-B, the current selectors for MOS 162 and MOS 163, and Aptitude Area General Maintenance, the logical alternate selector, both based upon tests of the Army Classification Battery, were validated against ratings of job performance obtained from on-the-job supervisors of 626 enlisted men in MOS 162 (AAA Gun Crewman) and of 38 enlisted men in MOS 163 (AAA Operations and Intelligence Specialist) during the latter half of 1955.

The current aptitude area selectors, CO-A (consisting of Arithmetic Reasoning Test, with a weight of 1, and Pattern Analysis Test, with a weight of 2) and CO-B (consisting of Pattern Analysis Test, with a weight of 1, and Mechanical Aptitude Test, with a weight of 2) were found to be quite satisfactory for these jobs and slightly superior than the predesignated alternate (unbiased validity estimates ranging from $r = .28$ to $.49$). The findings indicated that no immediate change of aptitude area should be recommended, since any improvement of prediction would require the introduction of new tests into the ACB.

18. No. 89. Helme, W. H. and White, R. K. *Prediction of on-job performance in guided missile crew specialties.* February 1958.

Scores on the Army Classification Battery tests and on ACB test composites were validated against ratings of job performance obtained from on-job supervisors of 231 enlisted men in MOS 220 (Guided Missile Crewman) and of 133 enlisted men in MOS 225 (Surface-to-Air Missile Launching Crewman) during the latter half of 1955.

The Electronic Aptitude Area (consisting of the Mechanical Aptitude Test, the Electronics Information Test, and the Radio Information Test, weighted equally) currently in use for these specialties was reasonably valid. The predesignated Aptitude Area Combat B (consisting of the Pattern Analysis Test, with a weight of 1, and the Mechanical Aptitude

Test, with a weight of 2) was sufficiently valid to be used, if necessary. Validity coefficients of the best composites were generally in the range of .35 to .45 for both jobs--quite high for predicting ratings of job performance but much lower for predicting performance of NCO's in MOS 225, presumably because experience and leadership requirements are more important than original aptitude for technical duties of NCO's in combat units. No change of selector was to be considered on the basis of these findings, until impending changes in the Combat Arms Aptitude Areas were completed.

19. No. 90. Helme, W. H. and White, R. K. *Validation of experimental aptitude tests for air defense crewmen.* February 1958.

The objective of this study was to determine the effectiveness not only of the current selectors but of six experimental electronic aptitude tests measuring motor coordination, perceptual speed, non-verbal reasoning, and mechanical knowledge, in the effort to improve classification techniques for electronics jobs which are increasing in importance and number in the Army.

Scores on the six experimental tests, on the Army Classification Battery tests, and on ACB test composites were compared with ratings of job performance obtained from on-job supervisors of over 1000 enlisted men as follows: 651 in MOS 162 (AAA Gun Crewman); 33 in MOS 163 (AAA Operations and Intelligence Specialist); 231 in MOS 220 (Guided Missile Crewman); and 133 in MOS 225 (Surface-to-Air Missile Launching Crewman). Two experimental composites--Two-Hand Coordination plus Mechanical Knowledge, and Mechanical Knowledge plus Arithmetic Reasoning--had validity comparable to that of the aptitude area selectors for these jobs. Unbiased validity estimates (the result of a validity generalization design) ranged as high as $r = .41$ for the best experimental predictor composites, considered quite high for predicting ratings of job performance.

Findings, viewed in comparison with results of combat arms selection studies recently completed (Technical Research Report 1110) suggested that either of the newly-developed Combat Aptitude Area composites was likely to be effective for these jobs. Findings also gave some support for the introduction of the Mechanical Knowledge Test into the ACB, possibly as a substitute for the current Shop Mechanics Test.

20. No. 91. Helme, W. H. and White, R. K. *Prediction of success in courses training EM for electronics and electrical maintenance jobs.* April 1958.

The high premium that the Pentomic organization has caused to be placed upon personnel capable of developing and applying electronics abilities and skills has increased the importance of giving close scrutiny to techniques for selecting enlisted men for electronics assignments. Present requirements for good electronics personnel are well in excess of supply. This study was conducted to summarize the effectiveness of Aptitude Area Electronic in predicting success in 12 Army school courses preparing men for assignments in the Electronics Occupational Area and in

electrical maintenance jobs. It was particularly desired, through this study, to obtain some initial research leads concerning the possibilities of refining current methods of matching available electronics manpower to requirements.

Indexes of predictive effectiveness of Aptitude Area EL and of other Army Classification Battery composites were obtained from earlier individual research studies and compared. The effects on washout rates of setting varying qualification scores on EL were also determined for the 12 courses studied. Aptitude Area EL had very satisfactory validity for all courses (unbiased validity estimates ranging from .46 to .83), but validity was particularly high for the nine electronics courses. Findings on the three electrical maintenance courses suggested that EL was probably being used too broadly, e.g., as a predictor for courses in which electrical-mechanical content predominates, when another aptitude area--GM--undoubtedly would be a better predictor. Analysis of cutting scores on EL suggested that a raising of prerequisites for five courses and a lowering of those for three other courses would probably increase classification efficiency.

Recommendations were made to raise or lower cutting scores as appropriate. It was decided that greater attention would be directed to the differentiation between requirements for electrical-mechanical skills as contrasted to truly electronics skills and between varying levels of electronics job requirements.

21. No. 92. Sharp, L. H., Helme, W. H., and DeJung, J. *Prediction of success in selected electronic repair jobs.* April 1958.

This study was one of a series to evaluate the effectiveness of the Army Classification Battery, particularly the Electronic Aptitude Area composite, in predicting performance in electronics and electrical equipment repair jobs.

The validity of three predesignated aptitude area composites (the current aptitude area and two logical alternates) was estimated for 73 Fire Control Equipment Repairmen, 184 Fixed Station Receiver and Transmitter Repairmen, 176 Carrier Equipment Repairmen, 178 Teletypewriter Repairmen, and 136 Powermen. All examinees had successfully completed prerequisite courses prior to being assigned on the job. Predesignated ACB composites were about as valid (average unbiased r of .22) as final grades in prerequisite courses for these jobs (average unbiased r of .23)--in general somewhat lower than validity estimates usually obtained in ACB job prediction studies. Even so, this validity evidence, when viewed along with previous school course findings and when compared with validity of the course grades themselves, indicated the Electronic Aptitude Area to be the best available selector for four of the five jobs and the Motor Maintenance Aptitude Area to be best for the job of Powerman.

Aptitude Area EL was retained as the selector for all jobs studied except that of Powerman. A recommendation was made to change from EL to MM as the selector for the Powerman course and subsequent job, thereby easing demands upon EL, a shortage area, for furnishing electronics qualified manpower for non-electronics requirements.

22. No. 93. Zeidner, J., Martinek, H., and Klieger, W. A. *Analysis of flight evaluations of Army helicopter pilot trainees.* April 1958.

A long-range research approach to the problem of reducing high attrition in the Army Cargo Helicopter Pilot Course has consisted basically of studies to determine how well various experimental and operational instruments can improve selection for the course. The present study was undertaken to provide insight into the various methods used in the ACHPC to evaluate trainees.

Relationships among training flight grades, final course grades, and the pass-fail decision of the review board pertaining to the pre-solo stage of ACHPC were determined for 487 trainees at Fort Rucker, Alabama enrolling between January 1955 and June 1956. Particularly desired was an evaluation technique that would represent the flying ability content of the pass-fail decision without including non-flying aspects of the training situation, and which would, in addition, be statistically more amenable to validation analysis. Such a measure was found in the percentage of satisfactory grades (S's) given in dual flight performances. S correlated $r(\text{bis}) = .92, .94, \text{ and } .98$ with pass-fail in three separate samples and $r = .40 \text{ to } .60$ with practical flight grade. Practical flight grade and academic grade were unrelated. Final course grade was much more heavily weighted in favor of the academic grade over the practical flight grade.

It was determined that the long-range studies would have to take cognizance of at least two types of criteria in validating new predictors for helicopter pilot training success.

23. No. 94. Sharp, L. H., Helme, W. H., and Boldt, R. F. *Prediction of success in administration and machine accounting jobs.* June 1958.

This study was another in a continuing series to keep the Army classification system up to date in relation to changing job and manpower requirements. In this study, the effectiveness of the Clerical and General Technical Aptitude Area composites were evaluated as predictors of performance in seven jobs in the Clerical Occupational Area.

Specifically, the validity of two predesignated aptitude area composites--Clerical, the current aptitude area of selection, and General Technical, a logical alternate--was estimated for 231 Stenographers, 139 Postal Clerks, 185 Personnel Specialists (Administration), 302 Personnel Specialists (Management), and 204 Machine Accounting Specialists. All examinees had successfully completed prerequisite courses prior to being assigned on the job. The general level of prediction provided by use of these aptitude area composites was about as high as could be reasonably expected in a job prediction study, since the r 's obtained, ranging from .19 to .49, were about as high as final grades in prerequisite courses for these jobs. Aptitude Areas CL and GT showed about equal predictive promise for five of the jobs; Aptitude Area GT indicated somewhat better predictive potential for the remaining two jobs.

The above findings constituted clear support for the substitution of Aptitude Area GT as the selector for Personnel Specialist (Administration) and Personnel Specialist (Management), and suggested the use of GT also for jobs of Administrative Specialist, Personnel Accounting Specialist, and Machine Accounting Specialist.

FY 1958 RESEARCH MEMORANDUMS

24. No. 57-16. Bayroff, A. G., Meyer, L. A., Sternberg, J., and Leedy, H. B. *Evaluation of the Individual Picture Recall Test, Forms 3 and 4.* July 1957.

IPRT-3 and -4 were shown to be equivalent forms and to have good validity against AFQT-3 and -4. It was accordingly concluded they would prove useful as aids in distinguishing between true and deliberate failures on AFQT. (File copy only)

25. No. 57-17. Bayroff, A. G., Morton, Mary A., and Sternberg, J. *Analysis of reports on the application of the Terminal Screening Guide.* July 1957.

Analysis of the bases reported by Personnel Psychologists for their decisions to accept administratively AFQT-5 and -6 failures examined during August to December 1956 led to the conclusion that the personal interview is relied upon more than are other sources of evidence provided for in the Terminal Screening Guide. (File copy only)

26. No. 57-18. Willemin, L. P. and Rosenberg, N. *Validation of potential combat predictors: Analysis of personality measures for artillery.* August 1957.

A personality measure to be validated in comparison with other experimental combat arms predictors in Project Riley was identified from PRB and HumRRO materials. The resulting Army Self Description Blank Interest-Opinion Questionnaire was clearly appropriate in the large artillery and armor samples (RM 57-19) and was applied by generalization to the small Combat Engineer branch sample (RM 57-20). (File copy only)

27. No. 57-19. Willemin, L. P., Birnbaum, A. H., Rosenberg, N., and White, R. K. *Validation of potential combat predictors: Analysis of personality measures for armor.* August 1957. (File copy only)

28. No. 57-20. Willemin, L. P., Birnbaum, A. H., Rosenberg, N., and White, R. K. *Validation of potential combat predictors: Analysis of personality measures for combat engineer.* August 1957. (File copy only)

29. No. 57-21. Parrish, J. A. *A summary of OCS selection and evaluation research 1941-1956.* October 1957.

The studies summarized give details of 15 years of research and development discussed in Technical Research Report 1107. (File copy only)

30. No. 57-22. Fuchs, E. F., Drucker, A. J., Haggerty, Helen R., and Sternberg, J. *Identifying career soldiers: A preliminary survey.* October 1957.

A detailed review was made of Defense-wide research completed or projected in the areas of job satisfaction, morale, reenlistment intentions, and reenlistment actions taken with the specific objective of isolating any characteristics crucial to the identification of the "career-motivated" soldier. (File copy only)

31. No. 57-23. Uhlener, J. E., Goldberg, S. C., Bornstein, H., Robinson, J. E., and Roy, H. L. *Determining a worker's net worth: A cost-accounting approach.* November 1957.

Symposium addresses delivered at American Psychological Association Convention Program, August-September 1957. (File copy only)

32. No. 57-24. Karcher, E. K., Trump, J. B., and Marron, J. E. *Test of abilities not covered by the ACB.* December 1957.

Nine major aptitude clusters of importance to military classification were identified from among a total of 67 aptitudes and related to aptitude requirements of the Army occupational structure as a basis for the construction of a new experimental battery. (File copy only)

33. No. 57-25. Bayroff, A. G., Morton, Mary A., and Marron, J. E. *Evaluation of shortened instructions for AFQT-type tests.* December 1957.

Experimental support was obtained for adopting shorter AFQT instructions on an operational basis, since the shorter instructions were shown to save time without affecting the test scores of individuals who can pass AFQT at the tenth percentile.

34. No. 57-26. Roy, H. L., Robins, A. R., Woods, I., and Marron, J. E. *Development of an experimental leadership performance test.* December 1957.

The Leadership Performance Test, consisting of physical training, drill, group discussion, tactics problems, and construction problems subtests, was constructed from a large variety of situational performance tests and techniques suggested from the psychological literature and from military personnel. These were administered to a sample of 304 Infantry OCS trainees for analysis purposes. (File copy only)

35. No. 57-27. Bornstein, H., Sadacca, R., and Phillips, R. *Development of differential officer leadership experimental test battery.* December 1957.

Descriptions and rationales are presented of 13 experimental instruments designed to measure officer characteristics which differ in importance in different officer job areas. Details of test construction and of subsequent research steps are also presented. (File copy only)

36. No. 57-28. Bayroff, A. G. and Meyer, L. A. *Recent psychometric developments pertaining to test efficiency.* December 1957.

Some implications are discussed of research publications bearing on the subject of efficiency of the types of tests used by the Army in selection, classification, and assignment, and particularly of the AFQT used by the Army and the other services in induction screening. (File copy only)

37. No. 57-29. Bayroff, A. G., Morton, Mary A., Rosenberg, N., and Marron, J. E. *Check for bias in validation of tests for special training.* December 1957.

With respect to two indices of misconduct (type of discharge and time lost) used in a concurrent research study to evaluate selection tests for EM of limited ability (Technical Research Report 1099), it was concluded that a 26 percent data collection return was representative of the total possible return. (File copy only)

38. No. 57-30. Marks, M. R., Berkhouse, R. G., Bornstein, H., Brown, Emma E., Dubin, S., Dunn, T., Kaplan, H., and Tye, V. M. *The construction of achievement and performance tests.* December 1957.

A 290-page draft manual including theory, planning, construction, administration, scoring, and interpretation of various types of paper-and-pencil and performance tests. (File copy only)

39. No. 58-1. Bayroff, A. G., Morton, Mary A., Hilligoss, R. E., and Kehr, Carol J. *Construction of vocabulary and arithmetic reasoning items for AFQT-7x and -8x.* January 1958.

On the assumption that cutting scores provided for the currently operational AFQT-5 and -6 would be appropriate for new forms AFQT-7 and -8, the distribution of estimated item difficulties for each of the four item types to be incorporated into the new experimental versions of AFQT was based on difficulty level of items in the AFQT-5 and -6. (File copy only)

40. No. 58-2. Bayroff, A. G., Hilligoss, R. E., and Kehr, Carol J. *Improvement of the reference test for AFQT.* February 1958.

On the basis of administration to 393 EM of the original R5 reference test and a revised version, it was determined that the revised version did not differ psychometrically from the original test and could be safely used as the reference standard for new forms of the AFQT. (File copy only)

41. No. 58-3. Johnson, C. D., Klieger, W. A., and Kotula, L. J. *Construction of an experimental paper-and-pencil test to predict reenlistment.* February 1958.

Construction of a reenlistment test was based on test content considered to reflect characteristics of potential career Army personnel: interests, attitudes toward military and civilian life, personality, adjustment habits, socio-economic status, rural-urban residence, mechanical inclination, and general adjustment level. (File copy only)

42. No. 58-4. Helme, W. H. and Boldt, R. *Data collection for prediction of success in Army school courses (Report as of December 1957).* February 1958.

An annual summary of the courses on which prediction of success research has been completed or is in progress. (File copy only)

43. No. 58-5. Helme, W. H. and Boldt R. *Data collection for prediction of on-the-job utility of enlisted men in Army jobs (Report as of December 1957).* February 1958.

An annual summary of the jobs (Military Occupational Specialties) on which prediction of success research has been completed or is in progress. (File copy only)

44. No. 58-6. Johnson, C. D., Klieger, W. A., and Frankfeldt, E. *Construction of a classification self-description blank designed to emphasize differences among occupational areas.* April 1958.

Of two test booklets developed, Booklet A contains 210 valid "general adjustment to Army life" and "general adjustment to Army jobs" items, and Booklet B contains 395 items specifically slanted for differential prediction among certain target jobs. (File copy only)

45. No. 58-7. Sawyer, J., Haggerty, Helen R., and Cook, K. G. *Construction of the Military Academy Questionnaire, MAQ-1, DA PT 3546.* April 1958.

MAQ-1 contains 50 5-choice items and 300 2-choice items reflecting one or more of 17 hypotheses concerning the probability that the individual will remain at West Point to the completion of training or resign from West Point prior to completion of training. (File copy only)

46. No. 58-8. Sawyer, J., Sadacca, R., Haggerty, Helen R., and Cook, K. G. *Preparation of an information test for OCS selection.* April 1958.

Construction of two experimental forms of the Leaders Information Test, designed to replace the Officer Candidate Test, was carried out to measure not only background of the OCS applicant with respect to critical academic abilities, but also motivational and leadership aspects of the individual's capabilities. (File copy only)

47. No. 58-9. Zeidner, J., Van Steenberg, N. J., and Anderson, A. A. *Prediction of success in the Army Cargo Helicopter Pilot Course.* May 1958.

After determining relationships between ACB tests and two ACHP course criteria (pass versus fail and final course grades) it was found that only the Pattern Analysis Test of the ACB showed any predictive promise against the attrition criterion and only Aptitude Area GT against final course grade. (File copy only)

48. No. 58-10. Rosenberg, N., Brown, Emma E., and DeJung, J. E. *Development of a background data questionnaire for identifying military delinquents.* May 1958.

Items selected for the Personal History Form were designed to test hypotheses concerning the background correlates of criminal behavior and of antisocial behavior tending to make a man a source of trouble in the Army, attitudes and reactions to conditions of military life after some weeks of Army experience, anticipated annoyances with living and working conditions ordinarily associated with Army life, and attitudes toward the Army as a career. (File copy only)

FY 1958 RESEARCH STUDIES

49. No. 58-1. Bolin, S. F. and King, S. H. *Improving assignment and allocation of personnel to combat units (research plans and beginnings).* April 1958.

Because the allocation of sufficient talent for combat leadership requirements is critical, studies have been planned and initiated to (a) obtain a detailed description of current assignment procedures and month-to-month variations in input and requirements, (b) measure "job importance" by means of rating procedures, cost, and utilization data, (c) program mathematical methods for the solution of allocation problems, given input, requirements, and job importance factors. To determine distribution of aptitudes of men typically assigned under present allocation methods to combat units and to study "job importance" factors, six Infantry and Armored divisions were visited during FY 1958 and data were collected from a total of 9,500 enlisted men and 280 officers.

50. No. 58-2. Fuchs, E. F. and Parrish, J. A. *An analysis of screening standards for Insular Puerto Ricans.* May 1958.

Because a very large proportion of inducted IPR's has been failing to qualify under the new "ACB-2" retention standards after completing eight weeks of prebasic English training in Puerto Rico, research was conducted to estimate the effect of the prebasic program on the qualification of IPR's under the ACB-2 program by testing and retesting experimental and control groups on a variety of screening and special qualification tests. The influence upon ACB and English Fluency Battery qualification of using varying cutting scores on the English Knowledge Examination, Examen Calificacion de Fuerzas Armadas, and Armed Forces Qualification Test was also examined.

Immediate retest gains of the control group were only slightly smaller than gains observed after eight weeks of prebasic training. Although AFQT (10th percentile) and a combination of EKE (Raw Score of 17) plus ECFA (Raw Score of 60) appeared to be equally valid as predictors, AFQT alone was found to accept about one-third fewer IPR's than would the other tests in combination. Modification of the training program itself to permit familiarization with ACB-type test materials and the incorporation of refresher material on written English also appeared to be in order.

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Personnel Research Branch Technical Research Reports and Notes are on file in each of the following libraries, listed by state.

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CROSS-REFERENCE LISTING OF RESEARCH TASK AND PRB RESEARCH PUBLICATIONS

For each Research Task listed, the Task number, title, and a brief statement of the Task objective has been included. The numbers at the conclusion of each listing refer to Technical Research Reports, Technical Research Notes, Research Memorandums, and Research Studies listed or abstracted on pages 3 to 20. Only those Tasks are listed for which one or more publications were issued during FY 1958.

TASK No. 1, FY 1958

Army Classification Tests For Combat Arms Selection

Prior research experience has led to the conclusion that the best results for efficient combat classification are likely to result from measuring not only technical skills and abilities, but also such personal factors as motivation, interest, and attitudes. Classification measures available prior to 1958 were minimally effective in selecting personnel for combat jobs. New classification tests and aptitude area combinations to be introduced operationally in 1958 will be used in selecting men who will perform successfully in combat jobs and in identifying, before assignment to the Combat Arms, those individuals who possess fighter potential.
4, 5, 6, 7, 8, 9, 16, 26, 27, 28

TASK No. 2, FY 1958

Assignment and Allocation of Personnel to Combat Units

US CONARC has expressed a need for studying the relative quality of manpower available to the Combat Arms and the supporting services, based on the belief that the relatively high standards set for school training in technical courses has resulted in relatively poor quality personnel for Combat Arms. It is planned through this task to develop an effective method for allocation and assignment to combat units of effective personnel in equitable numbers in order to maximize combat effectiveness in the future. Thus the objective of this task is to develop an adequate basis and feasible system for assigning men to the Combat Arms and supporting services. 49

TASK No. 4, FY 1958

Noncommissioned Officer Leadership Performance Tests

The NCO is not only a vital link in the chain of command but a moment-to-moment on-the-spot leader in generating the support of subordinates in getting a job done. The ability to make decisions, to deal effectively with people and to react readily and appropriately in different situations sets the NCO above and apart from the men he leads. Their spirit, morale, and success as a military force depend to a large extent on the effectiveness of the NCO as a leader. NCO's are appointed currently on the basis of evaluation by commissioned officers. In the absence of uniform standards, this evaluation is sensitive to the general level of performance prevailing at the time and place of appointment. The objective of the task is the construction of performance tests of NCO leadership. The tests must be simple to administer, have the ability to discriminate real differences in NCO leadership, and ability to yield objective scores sufficiently absolute to indicate actual leadership level reasonably independent of the scores made by other men tested at the same or other times and places. 34, 38

TASK No. 5, FY 1958

Differential Selection of Officer Leaders

Research conducted in the military services has shown considerable success in the development and use of tests which permit early identification of individuals who will successfully complete training and perform well in military assignments. Beginning in FY 1957, analysis of 10,000 existing records of officers was begun to determine whether demands of leadership and executive qualities are common to all officer jobs, or whether they differ from job to job. When such determination has been made, it will provide cues to the development of new measures predictive of future leadership of the kind or kinds demonstrated. 35

TASK No. 6, FY 1958

Selection of Officers for Commissioning

Maximally effective measures are needed to select men to be trained in officer procurement programs, such as OCS, ROTC, and the U. S. Military Academy. These measures will enable the Army to maintain the required high caliber of the Officer Corps and to reduce attrition in these training courses. Under this task clarification has been sought for the effectiveness of the present OCS instruments and for the impact of various operating conditions on this effectiveness. With respect to ROTC, study was undertaken of the need for leadership selectors to supplement the academic selection measures currently in use in determining acceptability for advanced ROTC. An experimental instrument designed to predict both leadership and early attrition was administered to applicants for admission to the U. S. Military Academy. 1, 29, 45, 46

TASK No. 7, FY 1958

Differential Ability Tests for Induction and Recruitment

The Department of Defense AFES Policy Board has directed the preparation of additional operational forms of the Armed Forces Qualification Test (AFQT) used to reject men who lack sufficient mental ability to succeed in the military services. In addition, measures are also to be provided permitting tentative identification, prior to induction, of those AFQT grade IV personnel whose ability patterns show promise of successful performance in specific Army jobs. Thus the new forms of AFQT are being developed with the dual objective of providing a measure of overall ability and of some of the measures of specific aptitudes which will permit accurate prediction of the Army's aptitude area scores. In addition, differential ability tests are being developed--an interim battery for early implementation and a final battery--to permit the identification of ability patterns of Army inductees. 2, 24, 25, 33, 36, 37, 39, 40

TASK No. 8, FY 1958

Early Identification of Enlisted Personnel Not Possessing Overall Acceptability

This task is based upon a need for the early identification of individuals who meet current induction standards but whose overall usefulness to the Army is sub-marginal. Although an individual may qualify for induction when standards for mental, moral, and physical qualifications are considered separately, his overall acceptability may fall below standards considered essential for productive active service. The ultimate goal of this research is the identification of such personnel prior to induction, but as an intermediate goal, means are being developed for making such identification early in basic training, at which time separation action can be taken. 31, 48

TASK No. 10, FY 1958

New Techniques for Enlisted Classification

In determining assignments for enlisted men in the Army, there is a need for measures of human factors not yet provided for in the Army Classification Battery. For example, measures are needed of personal factors which indicate what a man will do on the job, as opposed to what his potential is. The objective of this task is to explore new test content and devise new classification and assignment instruments which will increase the effectiveness of the Army Classification Battery. In addition to preliminary research on aptitudes not yet covered in the ACB, a survey has been conducted on the problem of identifying, at original enlistment, personnel who will later reenlist in the Army. 3, 30, 32, 41, 44, 50

TASK No. 11, FY 1958

Prediction of School Success and On-the-Job Utility of Enlisted Men

Basic to this task is a continuing need to insure the effectiveness of the Army's aptitude area system and to identify the most effective method of using the Army Classification Battery tests as selectors for various Army school courses and Army jobs. Evaluations of these tests are also needed to establish an objective basis for determining the minimum score on the ACB composites which will predict success in the training course or on the job. 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 23, 42, 43

TASK No. 12, FY 1958

Selection and Utilization of Electronics Personnel

DA staff agencies have indicated the need for more intensive research in the identification of individuals capable of absorbing and retaining electronics skills. The research task has been established to increase the pool of individuals with potential electronic capabilities in order that the Army may effectively meet its expanding requirements in this area. 20, 21

TASK No. 13, FY 1958

Selection of Army Helicopter Pilots

This task is a continuation of a three-year effort in answer to a need for an effective means of selecting students who will be successful in flight training and on the job as helicopter pilots. Present attrition in training of students who do not graduate is higher than desirable. Application of the extensive Air Force and Navy fixed-wing selection research has constituted a first step in approaching this problem. 22, 47